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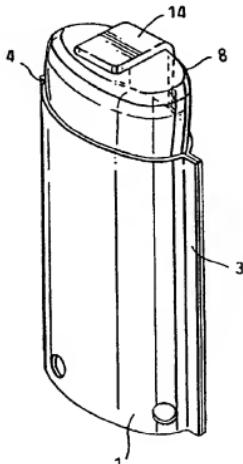
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(54) Title: PACKAGE FOR A FLUID COSMETIC COMPOSITION

(57) Abstract

A package suitable for topically applying a fluid cosmetic composition, and particularly a fluid antiperspirant or deodorant composition in the form of a cream or gel to human skin comprises a container having a sidewall made from one or more impervious sheets (1, 2) which exhibit longitudinal rigidity and transverse flexibility and which are sealed longitudinally and a flexible closure for the bottom (5) aperture sealed to the sidewall; a closure for the top aperture comprising a topwall (8), preferably arcuate, which has at least one aperture (13), preferably located centrally, which topwall (8) is surrounded by a skirt (9) that is sealed to the sidewall of the container and a cap (14) having plugs (18) which are congruent with the aperture(s) (13) in the topwall (8); Preferably the cap (14) is a hinged flap which is moulded integrally with the closure.



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Package for a Fluid Cosmetic Composition

The present invention relates to a package for a fluid cosmetic composition and more particularly to a package suitable for dispensing a flowable antiperspirant or deodorant composition.

Background

Flowable antiperspirant or deodorant compositions can comprise a number of forms, such as a liquid or a cream, or possibly a gel or micronized powder. Such flowable compositions have been dispensed in a variety of packages.

In the case of creams or gels, a conventional package comprises a rigid tubular container (a barrel) provided at one end with a convex distributing surface having an aperture connecting to the interior of the barrel and at the other end a piston located within the barrel and a mechanism for moving the piston axially toward the convex surface, and thereby exuding formulation through the aperture. This is commonly called a mushroom package on account of its physical resemblance to a mushroom. It is a very effective package for dispensing and distributing creams or gels topically, but the package itself can represent a significant fraction of the overall cost of the package plus contents.

It is accordingly an object of the present invention to provide a packaging for dispensing a flowable cosmetic composition such as an antiperspirant or deodorant

composition, and particularly a composition in the form of a cream or gel which can dispense the composition without a piston.

5 Summary of the invention

According to the present invention, there is provided a package for topically applying a fluid cosmetic composition to human skin which comprises

10 (i) a container having
(a) a sidewall made from one or more impervious sheets having opposite longitudinally extending first and second edges, a first strip adjacent the first edge and a second strip adjacent to the second edge, which sheets are flexible in a transverse direction, the first strip of one sheet being sealed to the second strip of the same sheet or to the second strip of a contiguous sheet when there are two or more sheets forming a closed chain, thereby enclosing a longitudinally extending volume

15 (b) a first end which defines a non-linear aperture closed by an end sheet and
(c) a second end opposite to the first end which defines a second non-linear aperture,

20 (ii) a closure positioned across the second end, the closure including an oval top wall with opposite exterior and interior surfaces, a skirt surrounding the top wall and at least one aperture formed in the topwall and communicating with the second non-linear aperture and

25

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(iii) a cap seatable over at least the aperture formed in the topwall of the closure, the cap including a roof with an inner surface and a flat outer surface, and a set of plugs projecting downwardly from the inner surface of the roof, the plugs being equivalent in number to the apertures and seatable therewithin to prevent egress of flowable substance from the container.

5 10 Advantageously, the package of the present invention provides an elegant means of forming a container for a fluid cosmetic composition, and particularly one which can be employed in conjunction with compositions in cream or gel form. The choice of a transversely flexible material to make the sidewall enables it to conform easily to the applicator for the composition. Moreover, as the composition flows out of the container, the sidewall deforms, until eventually the container is empty and the sidewall is flat. This deformation has two advantages. First, it becomes 15 readily apparent when the container is almost empty, providing a timely warning to the user that further composition needs to be purchased. Secondly, the container empties without a corresponding ingress of air. This avoids 20 or at least minimises any oxidation of the composition which 25 air might cause.

Detailed Description of the Invention

In the present invention, the container is formed from 30 either one flexible sheet which is bent around and sealed longitudinally or preferably a plurality of sheets which are

joined longitudinally to form a chain which is bent round and sealed to enclose a volume. Especially preferably, two sheets are employed. The sheet or chain of sheets forming the sidewall is sufficiently flexible in the transverse 5 direction to be bent around without cracking. Desirably, the sidewall exhibits sufficient rigidity longitudinally such that the container can stand upright, resting on the bottom edge of the sheet or sheets. The thickness of the sheet is desirably selected in order to combine appropriate 10 longitudinal rigidity with sufficient transverse flexibility. The sheet thickness is often selected within the range of from 0.02 to 1 mm, the thickness selected often taking into on the sheet material employed to the sidewall. The contents of the container may assist in providing 15 longitudinal rigidity to the container.

The sidewall sheets are preferably formed from a thermoplastic material, such as polyethylene or polypropylene and extruded sheets are especially suitable. 20 Low density (LDPE) and ultra-low density (LLDPE) polyethylene sheets are particularly suitable, and most preferably co-extruded LDPE and LLDPE sheets are employed. The sheets can further comprise reverse printed polyester.

25 Particularly preferably, the longitudinal join between either the first and second strips or between the respective strips on contiguous sheets forms an external tab, that is to say that the inner face of one sheet is joined to itself or to the inner face of a contiguous sheet. This represents 30 a particularly convenient and relatively simple means to seal one sheet to another. The seal can be effected by

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adhesive for the sheet material disposed continuously along the strips adjacent to the sheet edge. Particularly suitably, where the sheets are made from a thermoplastic or have a thermoplastic face that is to be joined, the sheets
5 can be joined by heat welding.

The sidewall is preferably made from two side sheets. The two side sheets can be placed the one upon the other and aligned, and joined whilst the sheets are flat, if desired.
10 Thereafter, the side wall can be bent to enclose a suitable volume, for example by pushing the tabs towards each other. Preferably, the two sheets are each rectangular and sealed together along the longer edges, most preferably to the bottom edge. The ratio of the length to breadth of the
15 sheet is preferably from 2:1 to 5:1 and especially from 3:1 to 4:1. The bottom edges of the sheets are not sealed together, but by virtue of being straight, enable the container to stand upright reasonably stably on its base after it has been filled.

20 The container preferably is dimensioned to contain from 20 to 100 mls cosmetic composition, such as antiperspirant or deodorant composition, and especially from 40 to 70 mls.

25 The first end of the container is closed by an end sheet, which is impervious to the fluid cosmetic composition. The sheet is preferably flexible, and highly desirably is formed from a thermoplastic material such as those contemplated for the sidewall. Desirably, the end sheet is disposed within
30 the first end such that a strip on the end sheet adjacent to its circumferential edge and on its inner face is in contact

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with the inner face of the sidewall, adjacent to the bottom edge of the sidewall. The end sheet advantageously is a planar sheet which is bent and positioned such that in the container it is non-planar, and particularly is convex in profile, normally extending downwardly in longitudinal cross section from edge to middle of the side sheets. This can be achieved by the end sheet advantageously being sealed to the side sheets closer to the second end at the side-edge of the side sheets and progressively further from the second end 10 approaching the middle of the side sheets, normally symmetrically.

The sidewall, preferably formed from two side sheets, and first end of the container desirably form a pouch made from 15 two sheets forming the sidewall and an end sheet, each made of a thermoplastics material, sealed together by hot welding contiguous faces adjacent to their edges. When the container has been filled, the pouch at or adjacent to its base (first end) in transverse cross section usually has a 20 maximum front to back spacing between the side sheets relative to the width of the pouch, of from 4:3 to 3:1 and particularly about 2:1, normally tapering to an acute interfacial angle at the longitudinal seal of the side sheets.

25 The second end of the container is closed by a closure which comprises a topwall from which a skirt depends. The skirt fits outside or preferably within the sidewall and is advantageously sealed to the sidewall along a strip adjacent 30 to the top edge of the sidewall and the bottom edge of the skirt. The closure is desirably rigid and imparts to some

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extent rigidity to the container. The skirt may be extended downwardly to form lugs in the vicinity of the aperture or apertures in the topwall, thereby further strengthening the container.

5

The topwall preferably presents a smooth arcuate surface externally, especially when viewed in side cross section, often having a wide angle of curvature. Its profile most desirably resembles the profile of a used solid

10 antiperspirant stick.

The topwall defines at least one and preferably a plurality of apertures, such as three, through which the composition can flow. The apertures are preferably positioned within a 15 central area of the topwall. The shape of the apertures is at the discretion of the package manufacturer. Suitable shapes include round, square, rectangular or serpentine apertures, the rectangular or serpentine apertures preferably extending at least predominantly transverse to 20 the major axis of the topwall.

The cap, if desired, can be separate from the closure, for example comprising a roof from which downwardly project plugs that are congruent with the apertures in the topwall 25 of the closure, and which roof is surrounded by an apron which push fits onto the skirt of the closure the roof.

30 Preferably, the cap comprises a flap which conforms to the shape of the apron and topwall of the closure, is hinged to the closure along a line just above and parallel to the sidewall of the container at or close to the minor axis of

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the topwall (a living hinge). The flap desirably covers the central area of the topwall and has plugs which downwardly project from its inner face that are congruent with the apertures in the topwall of the closure. The flap

5 preferably has a flat outer surface, permitting the package, if desired, to adopt an inverted stance.

The closure and the cap are each desirably moulded thermoplastic, for example polyethylene or polypropylene and 10 especially a high density polyethylene. The cap and the closure are preferably moulded in one piece.

The invention also provides a product comprising a package according to the first aspect described hereinbefore, in 15 which the container contains a fluid antiperspirant or deodorant composition that can be squeezed through the aperture by application of normal hand pressure to a flexible side-walled container. Such a formulation is normally observable as a cream or gel, and usually has a 20 viscosity within the range of from 5000 to 100000 mPas.s.

Viscosity measurements herein correspond to those made using a Brookfield™ RVT viscometer, No 2 spindle, at 20 rpm at 25°C.

25 The compositions normally comprise one or more of a) an antiperspirant active and/or b) a deodorant active, a) normally being selected in the range of 0.5 to 60%, often from 5 to 40% and b) normally being selected in the range of 30 from 0.1 to 90% and often up to 60%. The antiperspirant active a) is often an astringent aluminium zirconium or

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mixed aluminium zirconium salt or a complex thereof, such an aluminium chlorohydrate or a zirconium aluminium complex or an activated chlorohydrate or complex. The deodorant active can comprise a monohydric C1-C4 alcohol such as ethanol or 5 isopropanol, in which case it is often present at a concentration of at least 10% especially at least 20%, and can function at least in part as a carrier as well as deodorant. The deodorant can additionally or alternatively comprise bactericides such as chlorinated aromatics or 10 biguanides, often at a concentration of not more than 5% and particularly up to 2%.

Formulations employed herein commonly comprise from 10 to 95% of a carrier and especially from 30 to 90%. The carrier 15 can comprise a single phase, be it hydrophobic or hydrophilic, or can comprise a mixture of such phases, normally present as an emulsion. Suitable hydrophobic carriers can include volatile silicone oils such as cyclomethicones (especially tetramer, pentamer and/or 20 hexamer) or corresponding volatile linear methicones, and/or non-volatile hydrocarbon oils. Other suitable carriers include aliphatic ethers or esters containing a C8 to C30 group.

25 Hydrophilic carriers include water, aliphatic monohydric alcohols, especially ethanol, glycols or tri or polyhydric alcohols.

The viscosity of the fluid formulation is normally obtained 30 by incorporation of one or more structurants, gellants or thickeners in an amount which is effective and usually

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selected from 0.1 to 15% particularly from 1 to 10%. Suitable structurants include synthetic or natural carbon-based waxes, e.g. beeswax, hydroxystearic acid or castor wax or silicone waxes, or silicone elastomers. Suitable 5 gellants include fatty alcohols, certain amide derivatives of tricarboxylic acids, dibenzylidene sorbitol and N-acyl amino acid derivatives, e.g. n-lauroyl-L-glutamic acid dibutylamide. Suitable thickeners can include gums, starches cellulose derivatives and inorganic thickeners such 10 as clays or silica. Some viscosity increase can also be achieved by selection of carrier constituents of higher viscosity or by incorporation of particulate actives.

The formulation can also contain one or more conventional 15 minor additives, such as in an amount of up to 10%, such as fragrance, talc, or humectant (glycerol or sorbitol).

Except in operative or comparative examples, all numbers herein indicating amounts or ratios of materials, such as 20 limits of ranges are to be understood as modified by about, unless expressly stated otherwise.

In operation, the container is grasped in the hand and pressure is applied to opposing facets of the sidewall, 25 thereby squeezing the formulation through the aperture or apertures in the closure and onto the topwall. The topwall is wiped across the skin, distributing the formulation.

A package according to the present invention will now be 30 described more fully by way of example only and with reference to the accompanying Figures in which:-

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Figure 1 represents a front side view of the package with cap fitted in closed position;

Figure 2 represents a view of the base and rear side of the package with cap in closed position;

5 Figure 3 represent a top view of the package with cap in open position;

Figure 4 represents a sideways longitudinal cross-section through the package with cap in closed position;

10 Figure 5 represents an endways longitudinal cross section through the package with cap in an open position.

Figure 6 represents a plan view from underneath of an alternative cap.

In Figures 1 to 5, the package comprises container formed
15 from a front flexible sheet 1 and a rear flexible sheet 2 which are heat welded together along two longitudinally extending strips 3 and 4 adjacent to their longitudinal edges, and a flexible bottom sheet 5 which is heat welded to respectively front sheet 1 along bottom strip 7 and to front
20 sheet 2 along bottom strip 6, strips 6 and 7 being deeper where they are sealed to strips 3 and 4 than where they are remote from strips 3 and 4. The flexible sheets 1 and 2 are made from co-extruded low density polyethylene and ultra-low density polyethylene and exhibit flexibility in a transverse
25 direction, whilst retaining stiffness longitudinally. The bottom edge of each of the sheets 1 and 2 is orthogonal to their longitudinally extending edges, so that the container can rest on the bottom edge and stand upright. The flexible bottom sheet 5 is downwardly extending arcuate in cross
30 section. The upper end of the container is closed by a moulded closure which comprises an oval top surface 8 from

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which depends a skirt 9 which is heat sealed to flexible sheets 1 and 2. The skirt 9 has a pair of tabs 10 and 11. Located centrally within the top surface 8 of the closure are apertures 13. L shaped Flap 14 is integrally moulded 5 with the closure and is hinged to the skirt 8 along line 15.

In Figure 6, the cap comprises a separate removable cap which replaces the hinged flap described in Figures 1 to 5. The cap comprises a roof 16 surrounded by an apron 17 which 10 push fits onto the skirt 8 of the closure, and three centrally located plugs 18 which are congruent with the apertures 13 in the top surface 9 of the closure. The top surface of the cap in Figure 6 is flat.

15 Examples 1 to 8

These Examples describe fluid formulations which are suitable for employment in a package according to Figures 1 to 5 or as modified in Figure 6.

20 In the following Table
ACH represents aluminium chlorohydrate, AACH represents activated aluminium chloride, AZH represents aluminium zirconium pentachlorohydrate, AZAG represents aluminium 25 zirconium tetrachlorohydrex glycine complex, PHMB represents poly(hexamethylenebiguanide) salt, HPC represents Hydroxypropyl-cellulose, (*) indicates non-volatile and bal represents "to 100%".

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The Table

Constituent	Example No	Per cent by weight						
		1	2	3	4	5	6	7
ACH				16				
AACH					24			
AZH						25		
AZAG			20				25	25
PHMB	0.2							
Triclosan		0.1						
Ethanol	30	30						
Hydrocarbon oil (*)				1		10	15	
Silicone oil (*)					1.5		1.5	
Masking oil								15
Propylene glycol				5				
Glycerol			2					
HPC	0.7	0.7						
Stearic acid				11				
Fatty alcohol					10			
Castor Wax						5		4.5
Silicone wax						6		3
Suspending Agent		3			1	1		3
Propylene Carbonate			1					
Starch					3		25	
Talc			6			8		5
Glyceryl stearate				6.5				
PEG ester surfactant							3	1
Anionic surfactant				1				
Water + minors	bal	bal		bal				
Cyclomethicone + minors			Bal		bal	bal	bal	bal

Claims:

1. A package for topically applying a fluid cosmetic composition to human skin which comprises
 - 5 (i) a container having
 - (a) a sidewall made from one or more impervious sheets having opposite longitudinally extending first and second edges, a first strip adjacent the first edge and a second strip adjacent to the second edge, which sheets are flexible in a transverse direction, the first strip of one sheet being sealed to the second strip of the same sheet or to the second strip of a contiguous sheet when there are two or more sheets forming a closed chain, thereby enclosing a longitudinally extending volume
 - (b) a first end which defines a non-linear aperture closed by an end sheet and
 - (c) a second end opposite to the first end which defines a second non-linear aperture,
 - 10 (ii) a closure positioned across the second end, the closure including an oval top wall with opposite exterior and interior surfaces, a skirt surrounding the top wall and at least one aperture formed in the topwall and communicating with the second non-linear aperture and
 - 15 (iii) a cap seatable over at least the aperture formed in the topwall of the closure, the cap including a roof with an inner surface and a set of plugs projecting downwardly from the inner surface of the roof, the plugs being equivalent in number to the

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apertures and seatable therewithin to prevent egress of flowable substance from the container..

2. A package according to claim 1 in which the sheet having an inner face in contact with the enclosed volume and first and second longitudinally extending edges is bent around such that the inner face adjacent to the first longitudinally extending edge is sealed to the inner face of the sheet adjacent to the second longitudinally extending edge.
10
3. A package according to claim 1 or 2 in which the sidewall comprises a pair of flexible sheets which are joined by two longitudinally extending fluid-tight seals and are bent around to enclose a longitudinally extending volume.
15
4. A package according to any preceding claim in which the flexible sidewall sheets are joined by heat welding.
20
5. A package according to any preceding claim in which the flexible sidewall sheets comprise co-extruded low density polyethylene and ultra-low density polyethylene.
25
6. A package according to any preceding claim in which the flexible bottom sheet has a downwardly extending convex profile.
30
7. A package according to any preceding claim in which the topwall in the closure is oval.

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8. A package according to claim 7 in which there are at least two apertures in the topwall, preferably centrally located.

5

9. A package according to any preceding claim in which the closure is heat sealed to the sidewall.

10. A package according to any preceding claim in which the topwall presents an arcuate face for topically applying the cosmetic composition.

11. A package according to any preceding claim in which the cap is integrally moulded with the closure.

15

12. A package according to claim 11 in which the cap comprises a flap which covers a central area of the topwall of the closure and is hinged on the skirt of the closure.

20

13. A product comprising a package according to any preceding claim in which the container contains a flowable antiperspirant or deodorant composition.

25

Fig.1.

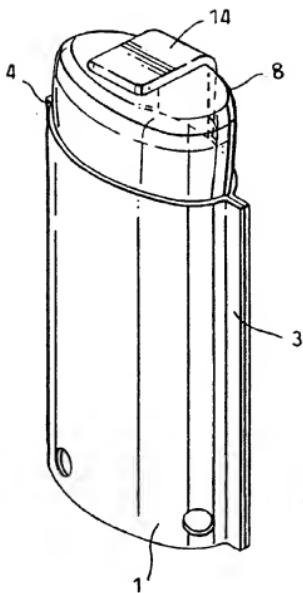


Fig.2.

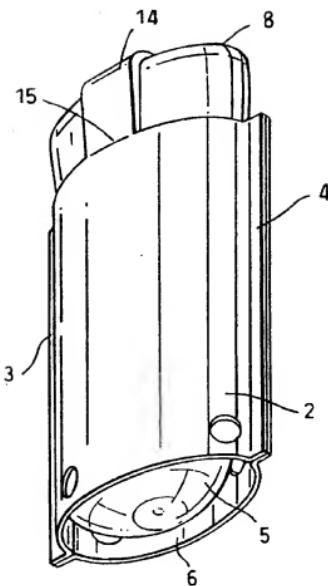


Fig.3.

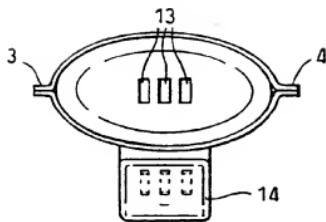


Fig.4.

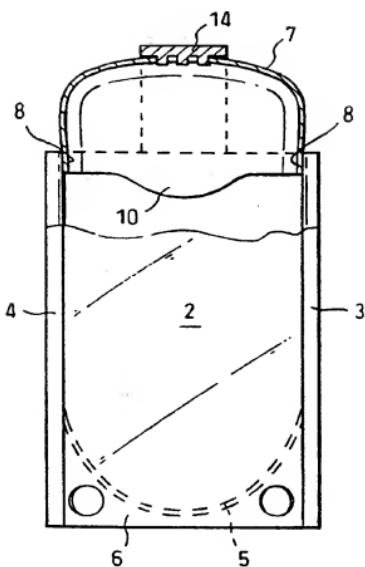


Fig.5.

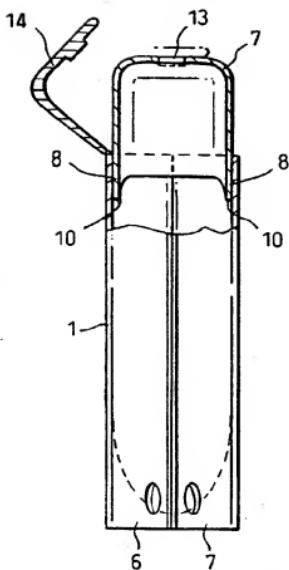
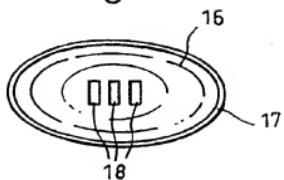


Fig.6.



INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/00955A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D75/58 A45D34/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D A45D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 754 246 A (SANOFI SA) 10 April 1998 (1998-04-10) page 5, line 10 -page 10, line 22; figures ---	1
A	US 4 732 299 A (HOYT EARL E) 22 March 1988 (1988-03-22) column 2, line 59 -column 4, line 5; figures 1-5 ---	1
A	US 5 511 697 A (GRUENBACHER DANA P ET AL) 30 April 1996 (1996-04-30) column 4, line 48 -column 5, line 67; figures 9-12 ---	1
A	US 4 158 902 A (CHERNACK MILTON P ET AL) 26 June 1979 (1979-06-26) column 6, line 33 -column 6, line 59; figures 9,10 ---	1
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/00955

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 743 441 A (ALBISSETTI NICOLAS ET AL) 28 April 1998 (1998-04-28) column 1, line 25 -column 1, line 63; figures -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 00/00955

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
FR 2754246	A 10-04-1998	WO	9815471 A	16-04-1998
US 4732299	A 22-03-1988	NONE		
US 5511697	A 30-04-1996	CA	2206325 A	27-06-1996
		JP	10510790 T	20-10-1998
		TR	960567 A	21-07-1996
		WO	9619396 A	27-06-1996
US 4158902	A 26-06-1979	NONE		
US 5743441	A 28-04-1998	FR	2736623 A	17-01-1997
		DE	69601668 D	15-04-1999
		DE	69601668 T	11-11-1999
		EP	0753466 A	15-01-1997
		ES	2130763 T	01-07-1999
		JP	2904745 B	14-06-1999
		JP	9024980 A	28-01-1997

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